

Various Vacuum Capacitor Noises

1. General

Vacuum Capacitor noises are generally not specified. They are difficult to detect since the ability to detect the sound is strongly influenced by the ambient noise. Additionally, the rating of capacitor noise is subjective and performed by the employees on the manufacturing line. If an unusual noise is heard above the normal ambient noise of the production facility, either during the production process or inspection, the capacitor is rejected.

Capacitor noises also strongly depend on the way the capacitor is mounted in a particular application. A particular mounting may amplify the noise of a capacitor. Very often the noise can only be heard after installation of the capacitor in the final system.

2. Definition of different noises

2.1 Squeaky Noise of Drive Screw

A squeaky noise can be caused by variations in nominal tolerances between the drive screw and nut. This noise usually occurs when the capacitance is being adjusted slowly (slip sticking). The noise usually can be eliminated by replacement of the drive screw. The noise is influenced by the coupling system and tends to occur more often when an Oldham-coupler is used. No degradation in capacitor life has been attributed to this noise.

2.2 Bellows noise: “Click-Click-sound”

This metallic “click-click” sound is a contact-free noise which can appear during slow or fast movement and is generated by the bellows caused by small variations of the spring-rate of the material. During life tests of such capacitors (Vitra-Con) at 50% of the nominal stroke reached > 3 M cycles. No degradation in capacitor life has been attributed to this noise. This noise cannot be eliminated.

2.3 Bellows noise: “scraping noise”

This scraping noise is caused by a slight touching of the bellows on the guide shaft due to normal variation in tolerances. It can be heard during adjustment of the capacitance. As the touching of the bellows is very slight, no degradation in capacitor life is attributed to this noise. The level of noise is monitored and units exhibiting excessive levels are rejected. This noise cannot be eliminated.

2.4 Whistling sound of the double bearing – Dual-Con Series

This whistling sound is caused by the two different materials (carbide and ceramic) in the bushing inside the capacitor that can occur during both fast and slow adjustment of the capacitance. No degradation in capacitor life has been attributed to this noise. It cannot be eliminated.